

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
21 October 2004 (21.10.2004)

PCT

(10) International Publication Number
WO 2004/090326 A1

(51) International Patent Classification⁷:

F03D 1/06

(21) International Application Number:

PCT/EP2003/003813

(22) International Filing Date: 12 April 2003 (12.04.2003)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicants (for all designated States except US): GENERAL ELECTRIC COMPANY [US/US]; 1 River Road, Schenectady, NY 12345 (US). SCHELLINGS, Vincent [NL/NL]; Park de Kotten 160, NL-7522 EH Enschede (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): DELUCIS, Nicolas [DE/DE]; Emdener Strasse 30, 48155 Münster (DE).

(74) Agents: HILLERMANN, Jochen et al.; Deichmannhaus am Dom, 50667 Cologne (DE).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

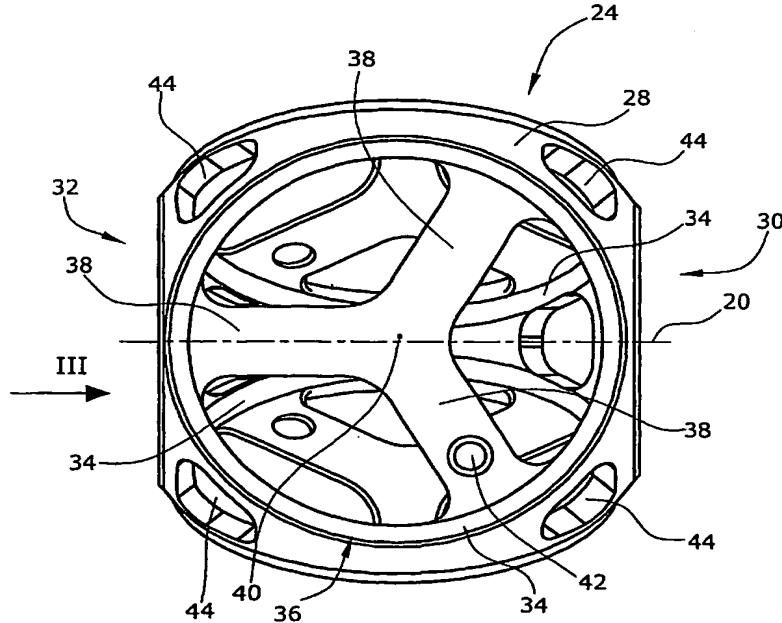
(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: REINFORCED HUB FOR THE ROTOR OF A WIND ENERGY TURBINE



WO 2004/090326 A1

(57) Abstract: The hub for the rotor (22) of a wind energy turbine (10) comprises a hollow body (28) rotatable around a rotation axis and provided with at least one flange (34) for mounting to the hollow body (28) a bearing for a rotor blade (26) and at least two stiffening webs (38) integrally formed with the hollow body (28) and radially extending within a flange area (36) of the hollow body (28) surrounded by the flange (34) to the center (40) of the flange area (36), wherein at least two openings are provided within the flange area (36) of the hollow body (28).

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP03/03813

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F03D1/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F03D B64C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01 42647 A (SCHERER RALF ROGER ;HEERKES HENDRIK JAN (NL); AERPAC HOLDING B V () 14 June 2001 (2001-06-14) abstract page 10, line 33 - line 36; figures 4,11 ---	1-16
A	US 4 863 352 A (HAUSER AMBROSE A ET AL) 5 September 1989 (1989-09-05) abstract column 2, line 34 - line 37; figures 2,3 ---	1
A	US 4 668 109 A (BASSO ROBERT J) 26 May 1987 (1987-05-26) column 2, line 49 - line 57; figures 2,3 ---	1
	-/-	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

& document member of the same patent family

Date of the actual completion of the international search

15 December 2003

Date of mailing of the international search report

29/12/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Criado Jimenez, F

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP03/03813

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 546 307 A (PORSCHE AG) 16 June 1993 (1993-06-16) abstract column 2, line 12 - line 52; figures 1,2,5 ----	1
A	US 4 995 023 A (MUELLER JACQUES ET AL) 19 February 1991 (1991-02-19) abstract column 2, line 44 - line 56; figures ----	1
A	US 4 759 459 A (MORONEY JAMES E ET AL) 26 July 1988 (1988-07-26) abstract; figures ----	1
A	US 4 112 693 A (COLLIN ALVARO L ET AL) 12 September 1978 (1978-09-12) abstract; figures ----	1
E	WO 03 064854 A (NIELSEN THOMAS KRAG ;NEG MICON AS (DK); SORENSEN STEFFEN (DK)) 7 August 2003 (2003-08-07) abstract; figures -----	1-16

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP/03813

Patent document cited in search report	Publication date	Patent family member(s)			Publication date
WO 0142647	A 14-06-2001	NL 1013807	C2	05-07-2001	
		AU 2558001	A	18-06-2001	
		EP 1238196	A2	11-09-2002	
		WO 0142647	A2	14-06-2001	
US 4863352	A 05-09-1989	CA 1253351	A1	02-05-1989	
		DE 3538599	A1	15-05-1986	
		FR 2572769	A1	09-05-1986	
		GB 2167136	A , B	21-05-1986	
		IT 1186327	B	26-11-1987	
		JP 61125998	A	13-06-1986	
US 4668109	A 26-05-1987	NONE			
EP 0546307	A 16-06-1993	DE 4141464	A1	17-06-1993	
		DE 9117160	U1	25-07-1996	
		DE 59201541	D1	06-04-1995	
		EP 0546307	A1	16-06-1993	
		ES 2069363	T3	01-05-1995	
US 4995023	A 19-02-1991	CH 675517	A	15-10-1990	
		DE 69000037	D1	30-04-1992	
		EP 0378125	A1	18-07-1990	
		HK 158296	A	30-08-1996	
		JP 2227695	A	10-09-1990	
		JP 2969523	B2	02-11-1999	
		SG 9590500	A2	18-08-1995	
US 4759459	A 26-07-1988	NONE			
US 4112693	A 12-09-1978	NONE			
WO 03064854	A 07-08-2003	WO 03064854	A1	07-08-2003	